WEST Search History

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DATE: Tuesday, November 01, 2005

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		DB=PGPB,USPT; PLUR=YES; OP=ADJ	
☐	L10	L6 and (guanine 37 or g37)	0
☐	L9	L6 and (val13 or val389)	0
☐	L8	L6 and (valine 13 or valine 389)	0
☐	L7	L6 and dna fragment	33
☐	L6	L5 and (fragment or portion)	374
☐	L5	L4 and chlamydomonas	374
☐	L4	L3 and transgenic	593
☐	L3	L2 and plant	666
☐	L2	L1 and herbicide	682
☐	L1	ppo or protoporphyrinogen oxidase	6208

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NEWS	7	SEP 09	ACD predicted properties enhanced in REGISTRY/ZREGISTRY
NEWS	8	OCT 03	MATHDI removed from STN
NEWS	9	OCT 04	CA/CAplus-Canadian Intellectual Property Office (CIPO) added to core patent offices
NEWS	10	OCT 06	STN AnaVist workshops to be held in North America
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NEWS	12	OCT 17	STN(R) AnaVist(TM), Version 1.01, allows the export/download of CAplus documents for use in third-party analysis and visualization tools
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NEWS EXPRESS JUNE 13 CURRENT WINDOWS VERSION IS V8.0, CURRENT MACINTOSH VERSION IS V6.0c(ENG) AND V6.0Jc(JP), AND CURRENT DISCOVER FILE IS DATED 13 JUNE 2005

NEWS HOURS	STN Operating Hours Plus Help Desk Availability
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=> s ppo or protopophyrinogen oxidase
L1 5701 PPO OR PROTOPOPHYRINOGEN OXIDASE

=> del l1 y

=> s ppo or protopophyrinogen
L1 5701 PPO OR PROTOPOPHYRINOGEN

=> s l1 and plant?
L2 1361 L1 AND PLANT?

=> s l2 and herbicide
L3 41 L2 AND HERBICIDE

=> dup rem l3
PROCESSING COMPLETED FOR L3
L4 26 DUP REM L3 (15 DUPLICATES REMOVED)

=> d 1-10 ti

L4 ANSWER 1 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
TI Inducers of **plant** disease resistance

L4 ANSWER 2 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
TI Protoporphyrinogen IX oxidase variant-expressing transgenic **plants** resistant to weed herbicidal compounds which disrupt the porphyrin pathways of **plants**

L4 ANSWER 3 OF 26 BIOSIS COPYRIGHT (c) 2005 The Thomson Corporation on STN
TI ELISA and liquid chromatography/mass spectrometry/mass spectrometry methods for sulfentrazone and its acid metabolite in groundwater samples.

L4 ANSWER 4 OF 26 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 1
TI Development of **PPO** inhibitor-resistant cultures and crops.

L4 ANSWER 5 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 2
TI A waterhemp (Amaranthus tuberculatus) biotype with multiple resistance across three **herbicide** sites of action

L4 ANSWER 6 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
TI Distribution and metabolism of D/L-, L- and D-glufosinate in transgenic, glufosinate-tolerant crops of maize (Zea mays L ssp mays) and oilseed rape (Brassica napus L var napus)

L4 ANSWER 7 OF 26 BIOSIS COPYRIGHT (c) 2005 The Thomson Corporation on STN
TI Amaranthus spp. and **herbicide** resistance: a growing concern in Canada and the US.

L4 ANSWER 8 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
TI Development of protoporphyrinogen oxidase as an efficient **herbicide** selection marker for transgenic crop **plants**

L4 ANSWER 9 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
TI Microbial **herbicide** metabolizing proteins, cDNAs, and use in weed control and generation of **herbicide**-resistant transgenic **plants**

L4 ANSWER 10 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
TI Putative F420-dependent glucose-6-phosphate dehydrogenase from Mycobacterium neoaurum, that degrades uracil backbone containing protoporphyrinogen oxidase (**PPO**) inhibitor-type herbicides, and encoding gene

=> d 2 pi

L4 ANSWER 2 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6906245	B1	20050614	US 2000-697719	20001027
	ZA 9902837	A	20001023	ZA 1999-2837	19990421
	US 6570070	B1	20030527	US 1999-302357	19990430

=> d 4 ab

L4 ANSWER 4 OF 26 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 1
AB Recent progress in the development of protoporphyrinogen oxidase (**PPO**, Protox) inhibitor-resistant **plant** cell cultures and crops is reviewed, with emphasis on the molecular and cellular aspects of this topic. **PPO herbicide**-resistant maize **plants** have been reported, along with the isolation of **plant PPO** genes and the isolation of **herbicide** -resistant mutants. At the same time, **PPO** inhibitor-resistant rice **plants** have been developed by expression of the Bacillus subtilis **PPO** gene via targeting the gene into either chloroplast or cytoplasm. Other attempts to develop **PPO herbicide** -resistant **plants** include conventional tissue culture methods, expression of modified co-factors of the protoporphyrin IX binding subunit proteins, over-expression of wild-type **plant PPO** gene, and engineering of P-450 monooxygenases to degrade the **PPO** inhibitor.

=> d 4 so

L4 ANSWER 4 OF 26 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 1
SO Pest management science, 2005 Mar. Vol. 61, issue 3 p. 277-285 ISSN: 1526-498X

=> d 8 ab

L4 ANSWER 8 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
AB Butafenacil is an inhibitor of **plant protopophyrinogen** oxidase (**PPO**) enzymes. Overexpression of naturally **herbicide** resistant **PPO** genes, or **PPO** genes that have been mutated to become **herbicide** resistant, is a strategy that has been reported to give resistance to di-Ph ether

herbicides (Lee et al, **Plant** cell pysiol 41:743-749 (2000)).
The work of Marc Law, Xiaggan Li and co-workers at Syngenta, focussed on the use and adaptation by mutagenesis of **plant PPO** genes to confer resistance to Butafenacil. Transgenic Arabidopsis and maize **plants** were produced that express a double mutant version of an Arabidopsis **PPO** coding sequence. Butafenacil has been used successfully as a selection agent in transformation expts. to kill **plants** or **plant** materials resulting from the transformation process, which are not transgenic or do not express the **PPO** transgene. Butafenacil selection in A.tumefaciens mediated transformation show that butafenacil is a good selection agent allowing transformation efficiencies in maize of around 20-40%. Selected maize lines containing the **PPO** transgene are resistant to an application of 400g ai/ha (3x effective field rate) with little or no detectable damage.

=> d 11-20 ti

L4 ANSWER 11 OF 26 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 3
TI Development of protoporphyrinogen oxidase as an efficient selection marker for Agrobacterium tumefaciens-mediated transformation of maize.

L4 ANSWER 12 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
TI Fluorometric labeling method for screening protoporphyrinogen oxidase inhibitors as potential herbicides

L4 ANSWER 13 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 4
TI A comparative investigation of the metabolism of the **herbicide** glufosinate in cell cultures of transgenic glufosinate-resistant and non-transgenic oilseed rape (Brassica napus) and corn (Zea mays)

L4 ANSWER 14 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
TI Construction of chimeric gene containing Arabidopsis thaliana plastid clpP and psbB gene promoters linked to genes (**PPO**, hemG or hemY) encoding resistance to herbicides, and their use in transforming **plants**

L4 ANSWER 15 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
TI **Herbicide**-resistant transgenic **plants** having protoporphyrinogen IX oxidase inhibitor binding activity, and use in weed control

L4 ANSWER 16 OF 26 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 5
TI Gene targeting in Arabidopsis.

L4 ANSWER 17 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
TI Method of controlling weeds in transgenic crops

L4 ANSWER 18 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
TI ELISA method in determination of sulfentrazone and the acid metabolite in water samples.

L4 ANSWER 19 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
TI A method for evaluating the ability of a compound to inhibit the protoporphyrinogen oxidase activity

L4 ANSWER 20 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 6

TI Carfentrazone-ethyl + mecoprop-p (platform S): a new **herbicide** for the control of cleavers and other broad-leaved weeds in wheat and barley

=> d 15 ab

L4 ANSWER 15 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
AB **Plants** resistant to herbicides that inhibit 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS) activity, are disclosed. The **plants** have non-native EPSPS and glyphosate oxidoreductase (GOX) activities, and are transformed with a gene coding for a protein that bind protoporphyrinogen IX oxidase (**PPO**) inhibitors, but not having Ig hypervariable regions. The herbicides are chlormethoxynil, bifenox, chlornitrofen, acifluorfen, or its Et ester, oxyfluorfen, oxadiazon, S-23142, chlorophthalim, TNPP-Et, LS82-556, and other heterocyclic compds. (Markush given). The proteins may be protoporphyrin IX-binding subunit of magnesium chelatase, protoporphyrinogen IX oxidase mutant, ferrochelatase, or coproporphyrinogen III oxidase (CPOX), etc. The substances may be protoporphyrinogen IX. Weed control and screening of the resistant **plants** are performed by applying herbicides to an area where the transgenic **plants** grow. Production of transgenic tobacco **plant** having a gene encoding tobacco Mg chelatase protoporphyrin IX-binding subunit, soybean or Chlamydomonas reinhardtii **PPO** gene, Arabidopsis thaliana ferrochelatase gene, or soybean CPOX gene, and a CTP-CP4 EPSPS gene was shown.

=> d 15 so

L4 ANSWER 15 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
SO Jpn. Kokai Tokkyo Koho, 66 pp.
CODEN: JKXXAF

=> d 15 pi

L4 ANSWER 15 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001190168	A2	20010717	JP 2000-328811	20001027

=> d 16 ab

L4 ANSWER 16 OF 26 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 5
AB Precise modification by gene targeting (GT) provides an important tool for studies of gene function in vivo. Although routine with many organisms, only isolated examples of GT events have been reported for flowering **plants**. These were at low frequencies precluding reliable estimation of targeting efficiency and evaluation of GT mechanisms. Here we present an unambiguous and straightforward system for detection of GT events in Arabidopsis using an endogenous nuclear gene encoding protoporphyrinogen oxidase (**PPO**), involved in chlorophyll and heme syntheses. Inhibition of **PPO** by the **herbicide** Butafenacil results in rapid **plant** death. However, the combination of two particular mutations renders **PPO** highly resistant to Butafenacil. We exploited this feature for selection of GT events by introducing the mutations into the **PPO** gene by homologous recombination. We have estimated the basal GT frequency to be 2.4 x 10(-3). Approximately one-third of events were true GT (TGT) leading

to the anticipated modification of the chromosomal **PPO** copy. The remaining events could be classified as ectopic GT (EGT) arising by modification of vector DNA by the chromosomal template and its random integration into the Arabidopsis genome. Thus the TGT frequency in our experimental setup is 0.72 x 10(-3). In view of the high efficiency of Arabidopsis transformation, GT experiments of a reasonable size followed by a PCR screen for GT events should also allow for modification of non-selectable targets. Moreover, the system presented here should contribute significantly to future improvement of GT technology in **plants**.

=> d 16 so

L4 ANSWER 16 OF 26 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 5
SO The Plant journal : for cell and molecular biology, Dec 2001. Vol. 28, No. 6. p. 671-677
Publisher: Oxford : Blackwell Sciences Ltd.
ISSN: 0960-7412

=> d 17 ab

L4 ANSWER 17 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
AB The invention provides a method for securing prolonged, e.g. preferably season-long, control of weeds in crops, the crop being tolerant to a **PPO**-inhibiting **herbicide**. The method comprises the pre-crop emergence application of an isoxazole or dione **herbicide** (Markush given), and optionally a post-crop emergence application of a **PPO**-inhibiting **herbicide** or a salt thereof.

=> d 17 pi

L4 ANSWER 17 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2000074488	A1	20001214	WO 2000-EP5782	20000530

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

=> d 19 ab

L4 ANSWER 19 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN
AB It is known that compds. which inhibit the **plant**-derived protoporphyrinogen oxidase (**PPO**) activity have generally herbicidal activity. The present invention relates to a method for evaluating the ability of a compound to inhibit the **PPO** activity. The method comprises the steps of: (1) culturing a transformant expressing a **PPO** gene present in a DNA fragment in a medium containing substantially no protoheme compds. in each comparative system of the presence and absence of a test compound to measure a growth rate of the transformant under each condition, said transformant being resulted from a

host cell deficient in the growing ability based on the **PPO** activity transformed with the DNA fragment in which a promoter functionable in the host cell and a protoporphyrinogen oxidase gene are operatively linked, and (2) determining the ability of the compound to inhibit the **PPO** activity by comparing the growth rates; and the like.

=> d 21-26 ti

L4 ANSWER 21 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 7
TI Florasulam (Primus), a new selective triazolopyrimidine sulfonanilide (ALS) **herbicide** to control broad-leaved weeds in cereals; Belgian results from 1994 to 1997

L4 ANSWER 22 OF 26 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 8
TI Species difference in protoporphyrin IX accumulation produced by an N-phenylimide **herbicide** im embryos between rats and rabbits.

L4 ANSWER 23 OF 26 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 9
TI Generation of resistance to the diphenyl ether **herbicide** acifluorfen by MEL cells.

L4 ANSWER 24 OF 26 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 10
TI Transgenic **plants** containing the phosphinothricin-N-acetyltransferase gene metabolize the **herbicide** L-phosphinothricin (glufosinate) differently from untransformed **plants**.

L4 ANSWER 25 OF 26 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 11
TI Peroxidase and polyphenol oxidase activities in Cyperus esculentus leaves following glyphosate applications

L4 ANSWER 26 OF 26 BIOSIS COPYRIGHT (c) 2005 The Thomson Corporation on STN
TI BIOCHEMICAL EFFECTS OF GLYPHOSATE ON **PLANT** MERISTEMS.

=> s l4 and chlamydomonas
L5 3 L4 AND CHLAMYDOMONAS

=> d 1-3 ti

L5 ANSWER 1 OF 3 CAPLUS COPYRIGHT 2005 ACS on STN
TI Protoporphyrinogen IX oxidase variant-expressing transgenic **plants** resistant to weed herbicidal compounds which disrupt the porphyrin pathways of **plants**

L5 ANSWER 2 OF 3 CAPLUS COPYRIGHT 2005 ACS on STN
TI **Herbicide**-resistant transgenic **plants** having protoporphyrinogen IX oxidase inhibitor binding activity, and use in weed control

L5 ANSWER 3 OF 3 CAPLUS COPYRIGHT 2005 ACS on STN
TI A method for evaluating the ability of a compound to inhibit the

protoporphyrinogen oxidase activity

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=> d  pi

L5   ANSWER 1 OF 3  CAPLUS  COPYRIGHT 2005 ACS on STN
     PATENT NO.          KIND   DATE        APPLICATION NO.         DATE
     ---------------     ----   --------    --------------------    --------
PI   US 6906245           B1    20050614    US 2000-697719          20001027
     ZA 9902837           A     20001023    ZA 1999-2837            19990421
     US 6570070           B1    20030527    US 1999-302357          19990430


=> d 2-3 so

L5   ANSWER 2 OF 3  CAPLUS  COPYRIGHT 2005 ACS on STN
SO   Jpn. Kokai Tokkyo Koho, 66 pp.
     CODEN: JKXXAF

L5   ANSWER 3 OF 3  CAPLUS  COPYRIGHT 2005 ACS on STN
SO   Eur. Pat. Appl., 46 pp.
     CODEN: EPXXDW


=> d 2-3 pi

L5   ANSWER 2 OF 3  CAPLUS  COPYRIGHT 2005 ACS on STN
     PATENT NO.          KIND   DATE        APPLICATION NO.         DATE
     ---------------     ----   --------    --------------------    --------
PI   JP 2001190168        A2    20010717    JP 2000-328811          20001027

L5   ANSWER 3 OF 3  CAPLUS  COPYRIGHT 2005 ACS on STN
     PATENT NO.          KIND   DATE        APPLICATION NO.         DATE
     ---------------     ----   --------    --------------------    --------
PI   EP 955380            A2    19991110    EP 1999-107037          19990409
     EP 955380            A3    20030618
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, LT, LV, FI, RO
     AU 9923649           A1    19991021    AU 1999-23649           19990408
     AU 769868            B2    20040205
     CA 2266807           AA    19991010    CA 1999-2266807         19990409
     JP 11346787          A2    19991221    JP 1999-102534          19990409
     US 6472164           B1    20021029    US 1999-289180          19990409
     US 2002086395        A1    20020704    US 2001-978709          20011018
     US 6830926           B2    20041214


=> s l4 and valine
L6            0 L4 AND VALINE

=> s ((boynton j?) or (boynton, j?))/au
L7          364 ((BOYNTON J?) OR (BOYNTON, J?))/AU

=> s l7 and protoporphyrinogen
L8           10 L7 AND PROTOPORPHYRINOGEN

=> dup rem l8
PROCESSING COMPLETED FOR L8
L9            5 DUP REM L8 (5 DUPLICATES REMOVED)

=> d 1-5 ti

L9   ANSWER 1 OF 5  CAPLUS  COPYRIGHT 2005 ACS on STN
TI   Methods of conferring resistance to herbicides inhibiting
```

protoporphyrinogen biosynthesis to crop plants

L9 ANSWER 2 OF 5 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 1
TI Isolation and characterization of a mutant **protoporphyrinogen** oxidase gene from Chlamydomonas reinhardtii conferring resistance to porphyric herbicides.

L9 ANSWER 3 OF 5 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 2
TI Characterization of a mutant of Chlamydomonas reinhardtii resistant to **protoporphyrinogen** oxidase inhibitors.

L9 ANSWER 4 OF 5 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 3
TI Isolation of characterization of a Chlamydomonas reinhardtii mutant resistant to photobleaching herbicides

L9 ANSWER 5 OF 5 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 4
TI Isolation and characterization of a Chlamydomonas reinhardtii mutant resistant to an experimental herbicide S-23142, which inhibits chlorophyll synthesis

=> d pi

L9 ANSWER 1 OF 5 CAPLUS COPYRIGHT 2005 ACS on STN

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9829554	A1	19980709	WO 1996-US20415	19961227
	W: AU, CA, JP, US				
	RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	CA 2276053	AA	19980709	CA 1996-2276053	19961227
	AU 9714298	A1	19980731	AU 1997-14298	19961227
	AU 739948	B2	20011025		
	EP 1007703	A1	20000614	EP 1996-944519	19961227
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
	JP 2002528036	T2	20020827	JP 1998-529941	19961227

=> d 2 so

L9 ANSWER 2 OF 5 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 1
SO Plant molecular biology, Nov 1998. Vol. 38, No. 5. p. 839-859
Publisher: Dordrecht : Kluwer Academic Publishers.
CODEN: PMBIDB; ISSN: 0167-4412

=> d 2 ab

L9 ANSWER 2 OF 5 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 1
AB In plant and algal cells, inhibition of the enzyme **protoporphyrinogen** oxidase (Protox) by the N-phenyl heterocyclic herbicide S-23142 causes massive protoporphyrin IX accumulation, resulting

in membrane deterioration and cell lethality in the light. We have identified a 40.4 kb genomic fragment encoding S-23142 resistance by using transformation to screen an indexed cosmid library made from nuclear DNA of the dominant rs-3 mutant of Chlamydomonas reinhardtii. A 10.0 kb HindIII subclone (Hind 10) of this insert yields a high frequency of herbicide-resistant transformants, consistent with frequent non-homologous integration of the complete RS-3 gene. A 3.4 kb XhoI subfragment (Xho3.4) yields rare herbicide-resistant transformants, suggestive of homologous integration of a portion of the coding sequence containing the mutation. Molecular and genetic analysis of the transformants localized the rs-3 mutation conferring S-23142 resistance to the Xho3.4 fragment, which was found to contain five putative exons encoding a protein with identity to the C-terminus of the Arabidopsis Protox enzyme. A cDNA clone containing a 1698 bp ORF that encodes a 563 amino acid peptide with 51% and 53% identity to Arabidopsis and tobacco Protox I, respectively, was isolated from a wild-type C. reinhardtii library. Comparison of the wild-type cDNA sequence with the putative exon sequences present in the mutant Xho3.4 fragment revealed a G leads to A change at 291 in the first putative exon, resulting in a Val leads to Met substitution at a conserved position equivalent to Val-389 of the wild-type C. reinhardtii cDNA. A sequence comparison of genomic Hind10 fragments from C. reinhardtii rs-3 and its wild-type progenitor CC-407 showed this G leads to A change at the equivalent position (5751) within exon 10.

=> d 2 au

L9 ANSWER 2 OF 5 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 1
AU Randolph-Anderson, B.L.; Sato, R.; Johnson, A.M.; Harris, E.H.; Hauser, C.R.; Oeda, K.; Ishige, F.; Nishio, S.; Gillham, N.W.; **Boynton**, J.E.

=> d 3 so

L9 ANSWER 3 OF 5 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 2
SO ACS symposium series, 1994. No. 559. p. 91-104
Publisher: Washington, D.C. : American Chemical Society, 1974-
CODEN: ACSMC8; ISSN: 0097-6156

=> d 4 so

L9 ANSWER 4 OF 5 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 3
SO Zeitschrift fuer Naturforschung, C: Journal of Biosciences (1993), 48(3-4), 339-44
CODEN: ZNCBDA; ISSN: 0341-0382

=> d 5 so

L9 ANSWER 5 OF 5 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 4
SO Res. Photosynth., Proc. Int. Congr. Photosynth., 9th (1992), Volume 3, 567-70. Editor(s): Murata, Norio. Publisher: Kluwer, Dordrecht, Neth.
CODEN: 59IZA5

=> s ((gillham n?) or (gillham, n?))/au

```
L10        311 ((GILLHAM N?) OR (GILLHAM, N?))/AU

=> s l10 and protoporphyrinogen
L11         10 L10 AND PROTOPORPHYRINOGEN

=> dup rem l11
PROCESSING COMPLETED FOR L11
L12          5 DUP REM L11 (5 DUPLICATES REMOVED)

=> d 1-5 ti

L12  ANSWER 1 OF 5  CAPLUS  COPYRIGHT 2005 ACS on STN
TI   Methods of conferring resistance to herbicides inhibiting
     protoporphyrinogen biosynthesis to crop plants

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     of America.  It contains copyrighted materials.  All rights reserved.
     (2005) on STN                                          DUPLICATE 1
TI   Isolation and characterization of a mutant protoporphyrinogen
     oxidase gene from Chlamydomonas reinhardtii conferring resistance to
     porphyric herbicides.

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     (2005) on STN                                          DUPLICATE 2
TI   Characterization of a mutant of Chlamydomonas reinhardtii resistant to
     protoporphyrinogen oxidase inhibitors.

L12  ANSWER 4 OF 5  CAPLUS  COPYRIGHT 2005 ACS on STN  DUPLICATE 3
TI   Isolation of characterization of a Chlamydomonas reinhardtii mutant
     resistant to photobleaching herbicides

L12  ANSWER 5 OF 5  CAPLUS  COPYRIGHT 2005 ACS on STN  DUPLICATE 4
TI   Isolation and characterization of a Chlamydomonas reinhardtii mutant
     resistant to an experimental herbicide S-23142, which inhibits chlorophyll
     synthesis


=> s ((randolph-anderson b?) or (randolph-anderson, b?))/au
L13         24 ((RANDOLPH-ANDERSON B?) OR (RANDOLPH-ANDERSON, B?))/AU

=> s l13 and protoporphyrinogen
L14          4 L13 AND PROTOPORPHYRINOGEN

=> dup reml14
ENTER REMOVE, IDENTIFY, ONLY, OR (?):l14
'L53' IS NOT VALID HERE
Enter "REMOVE" to identify and remove duplicate answers.
Enter "IDENTIFY" to identify duplicate answers in the answer set.
Enter "ONLY" to identify and create an answer set containing only
duplicate records.
ENTER REMOVE, IDENTIFY, ONLY, OR (?):only
ENTER L# LIST OR (END):end

=> dup rem l14
PROCESSING COMPLETED FOR L14
L15          2 DUP REM L14 (2 DUPLICATES REMOVED)

=> d 1-2 ti

L15  ANSWER 1 OF 2  CAPLUS  COPYRIGHT 2005 ACS on STN
TI   Methods of conferring resistance to herbicides inhibiting
```

protoporphyrinogen biosynthesis to crop plants

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TI Isolation and characterization of a mutant **protoporphyrinogen** oxidase gene from Chlamydomonas reinhardtii conferring resistance to porphyric herbicides.

=> s ((ishige f?) or (ishige, f?))/au
L16 29 ((ISHIGE F?) OR (ISHIGE, F?))/AU

=> s l16 and protoporphyrinogen
L17 4 L16 AND PROTOPORPHYRINOGEN

=> dup rem l17
PROCESSING COMPLETED FOR L17
L18 2 DUP REM L17 (2 DUPLICATES REMOVED)

=> d 1-27 ti

L18 ANSWER 1 OF 2 CAPLUS COPYRIGHT 2005 ACS on STN
TI Methods of conferring resistance to herbicides inhibiting **protoporphyrinogen** biosynthesis to crop plants

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TI Isolation and characterization of a mutant **protoporphyrinogen** oxidase gene from Chlamydomonas reinhardtii conferring resistance to porphyric herbicides.

=> s ((sato r?) or (sato, r?))/au
L19 3131 ((SATO R?) OR (SATO, R?))/AU

=> s l19 and protoporphyrinogen
L20 11 L19 AND PROTOPORPHYRINOGEN

=> dup rem l20
PROCESSING COMPLETED FOR L20
L21 6 DUP REM L20 (5 DUPLICATES REMOVED)

=> d 1-6 ti

L21 ANSWER 1 OF 6 CAPLUS COPYRIGHT 2005 ACS on STN
TI Flumioxazin as a new herbicide

L21 ANSWER 2 OF 6 CAPLUS COPYRIGHT 2005 ACS on STN
TI Methods of conferring resistance to herbicides inhibiting **protoporphyrinogen** biosynthesis to crop plants

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TI Isolation and characterization of a mutant **protoporphyrinogen** oxidase gene from Chlamydomonas reinhardtii conferring resistance to porphyric herbicides.

L21 ANSWER 4 OF 6 AGRICOLA Compiled and distributed by the National

Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2005) on STN DUPLICATE 2

TI Characterization of a mutant of Chlamydomonas reinhardtii resistant to **protoporphyrinogen** oxidase inhibitors.

L21 ANSWER 5 OF 6 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 3

TI Isolation of characterization of a Chlamydomonas reinhardtii mutant resistant to photobleaching herbicides

L21 ANSWER 6 OF 6 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 4

TI Isolation and characterization of a Chlamydomonas reinhardtii mutant resistant to an experimental herbicide S-23142, which inhibits chlorophyll synthesis

=> d 3 ab

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AB In plant and algal cells, inhibition of the enzyme **protoporphyrinogen** oxidase (Protox) by the N-phenyl heterocyclic herbicide S-23142 causes massive protoporphyrin IX accumulation, resulting in membrane deterioration and cell lethality in the light. We have identified a 40.4 kb genomic fragment encoding S-23142 resistance by using transformation to screen an indexed cosmid library made from nuclear DNA of the dominant rs-3 mutant of Chlamydomonas reinhardtii. A 10.0 kb HindIII subclone (Hind 10) of this insert yields a high frequency of herbicide-resistant transformants, consistent with frequent non-homologous integration of the complete RS-3 gene. A 3.4 kb XhoI subfragment (Xho3.4) yields rare herbicide-resistant transformants, suggestive of homologous integration of a portion of the coding sequence containing the mutation. Molecular and genetic analysis of the transformants localized the rs-3 mutation conferring S-23142 resistance to the Xho3.4 fragment, which was found to contain five putative exons encoding a protein with identity to the C-terminus of the Arabidopsis Protox enzyme. A cDNA clone containing a 1698 bp ORF that encodes a 563 amino acid peptide with 51% and 53% identity to Arabidopsis and tobacco Protox I, respectively, was isolated from a wild-type C. reinhardtii library. Comparison of the wild-type cDNA sequence with the putative exon sequences present in the mutant Xho3.4 fragment revealed a G leads to A change at 291 in the first putative exon, resulting in a Val leads to Met substitution at a conserved position equivalent to Val-389 of the wild-type C. reinhardtii cDNA. A sequence comparison of genomic Hind10 fragments from C. reinhardtii rs-3 and its wild-type progenitor CC-407 showed this G leads to A change at the equivalent position (5751) within exon 10.

=> d 3 so

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SO Plant molecular biology, Nov 1998. Vol. 38, No. 5. p. 839-859
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